

wherein the vinylene unit may be a trans vinylene unit or a cis vinylene unit, and n is the number of units of the respective formula in the polymer.

#### REMARKS

The Examiner held claim 13 allowable over the prior art. New claim 32 contains the subject matter of allowable claim 13 in independent form.

The Examiner continues to reject claims 1-7, 9, 11-12, 14-24 and 30-31 under 35 U.S.C. § 103(a) as being obvious over Antoniadis, or Wan, or Chsieh.

The Examiner admits that the references do **not** disclose the claimed "soluble characteristic". However, the Examiner asserts that the composition disclosed by the references is prepared from reactant and process conditions that are allegedly inclusive of the claimed reactants and conditions, and in view of the similarity, the Examiner asserts that it **appears** to be **inherent** that a product

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having the claimed soluble characteristic **could** be prepared following the teachings of the references.

Applicant respectfully asserts that the Examiner, in his analysis of the cited references, has included a number of false assumptions and errors in reaching the conclusion of assumed or apparent inherency. Applicant will address each of these false assumptions and errors and following these corrections, applicant believes the Examiner should find the present claims allowable over the art.

### **False Assumptions and Errors**

1. The Examiner has stated that "the claimed soluble characteristic must be considered inherent in the prior art". This is completely incorrect.

Each of Antoniadis, Wan and Hsieh disclose diphenyl polyphenylene vinylene (DP-PPV). Applicant has already provided a copy of an abstract from conference proceedings which **explicitly refers to the insolubility of PPVs and explicitly refers to DP-PPV and it's synthesis by a chlorine precursor route.**

The Examiner has not explained why he considers this evidence not to be persuasive.

As further evidence, applicant attaches an article entitled "Short Lifetimes of Light Emitting Polymers" by Jeffrey Frederick Gold of the University of Cambridge, which may be found on the Internet at [www.math.utah.edu/~gold/doc/lep.pdf](http://www.math.utah.edu/~gold/doc/lep.pdf). Page 3 of this Article provides further evidence that DP-PPV is insoluble. It is stated at the top of column 2 on page 3 that "the various properties of polymers,

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particularly solubility, limit the methods by which devices can be constructed".

Further, it is stated that one synthesis of the "insoluble" conjugated polymer PPV is a two-step process: a precursor monomer is polymerised and forms a soluble precursor polymer, after which the precursor is spin-coated onto a substrate and thermally converted to PPV. It readily will be appreciate that this two-step process is the same two-step process used in the prior art to prepare DP-PPV. Thus it is clear that DP-PPV also is an **insoluble** polymer.

In view of all of the above evidence, it is submitted that the Examiner now must accept that the claimed "soluble characteristic" is not inherent in the prior art.

2. The Examiner is of the view that the diagram filed with applicant's response of November 13, 2002, is not persuasive because it is not commensurate in scope with the claims. This also is not correct.

Claim 1 is directed to a compound comprising a soluble, film-forming conjugated poly(1,4-arylenevinylene) compound having a 1,4-phenylene vinylene unit with adjacent substituents . . . . As outlined previously, a combination of factors will determine whether the compound is soluble, such as the nature of each of the "adjacent substituents", on the phenylene vinylene unit, the nature of any further substituents on the phenylene vinylene unit, and the nature of any repeat units in the polymer backbone other than the phenylene vinylene units. This being the case, the term "soluble" in claim 1 means that in order for a compound to fall within the scope of claim 1, this combination of factors must be such that the polymer is soluble.

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In the diagram provided with applicant's response of November 13, 2002, the one-step process shown in part C exemplifies a compound according to this invention. In the exemplified compound the combination of factors mentioned above indeed is such that the polymer is soluble. In this sense, the diagram merely was intended to compare one soluble compound that is in accordance with this invention with one insoluble compound, namely DP-PPV, as known in the prior art that is not in accordance with this invention. The diagram was intended to more clearly show why it may be inferred from the prior art that DP-PPV is insoluble (namely by virtue of the nature of the method which must be used to produce it). Thus, the evidence submitted by applicant is commensurate with the claim language and it is submitted that the Examiner must acknowledge that the soluble characteristic is not inherent in DP-PPV.

3. The Examiner has alleged that the applicant has presented no factual evidence to show why DP-PPV would not be soluble. This again is completely incorrect.

On the diagram attached to the applicant's response of November 13, 2002, the two phenyl groups in DP-PPV are labeled as "groups which are not solubilising".

Thus, the factual evidence to show why DP-PPV is not soluble may be summarized as the following:

- PPV is an insoluble polymer (see page 3 column 2 line 6-7 of article entitled "Short Lifetimes of Light Emitting Polymers" as evidence of this).

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- In order to make a PPV derivative that is soluble one must make a modification to the PPV which renders it soluble. It is well known that the solubility of a polymer is dictated by the groups which make up the polymer. Possible modifications to a polymer structure such as adding substituents on the polymer repeat unit or including further, different repeat units would be known generally by polymer chemists. The modification to PPV must aid solubility in order to render the PPV derivative soluble.
- If one makes a modification to PPV which does not aid solubility (as in the case of including adjacent phenyl substituents for DP-PPV), the PPV derivative will be insoluble, as is PPV.

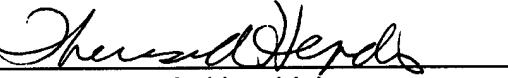
Thus, the present record clearly establishes the patentability of claims 1-7, 9, 11-12, 14-24 and 30-31 over the cited prior art.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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